SUMMARY REPORT: HOSPITAL CARE

TRENDS IN QUALITY INDICATORS FOR HEALTH CARE IN RHODE ISLAND (1994-1998): HOSPITAL CARE, ACCESS TO CARE AND UTILIZATION OF INPATIENT PROCEDURES

Prepared for the Rhode Island Department of Health
by Quality Analytic Services
National Perinatal Information Center
Providence, Rhode Island

Janet H. Muri, MBA
Vice-President

Jerry S. White, BA
Senior Technology Analyst

John C. Pezzullo, PhD
Associate Professor, Clinical Pharmacology and Biostatistics
Georgetown University

Project Officer for the Rhode Island Department of Health:
Jay S. Buechner, PhD
Chief, Office of Health Statistics

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Sharon Clingham, RN, St. Joseph Health Services of Rhode Island
Jane Griffin, MCH Evaluation
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EXECUTIVE SUMMARY

This report provides information on the quality of hospital inpatient care in Rhode Island and the United States. It presents one perspective on hospital performance, one assessment of the quality of inpatient care in all of the State's acute-care general hospitals for the five-year period 1994-1998. This report is part of the Health Care Quality Performance Measurement and Reporting Program, established in 1998 by the Rhode Island General Assembly.

The ten quality indicators we profiled in this report are part of a set of 35 indicators developed by the Agency for Healthcare Research and Quality (AHRQ) to measure the quality of hospital care. These ten indictors were selected because they affect larger numbers of patients in hospitals and because they focus out attention on complications of care that may be improved by hospital action. AHRQ worked with expert panels to develop all 35 indicators, which were accepted by the health care community, which can be calculated easily from available data, and which can be used as a screening tool to guide hospitals and the state to priority issues in quality improvement.

In this report, we have compared the Rhode Island performance on ten indicators to the national performance. Overall, Rhode Island compares well to the national benchmarks for these ten indicators.

- For four indicators, Rhode Island hospitals performed above the national benchmark:
  - Pulmonary compromise (lung congestion, breathing difficulties) after major surgery
  - Gastrointestinal hemorrhage or ulceration (bleeding or hole in the lining of the stomach or bowel) after major surgery
  - Venous thrombosis or pulmonary embolism (blood clots in the veins or lungs) after major surgery
  - Obstetrical complications (bleeding or severe tears after delivering a baby, etc.)
- For three indicators, Rhode Island hospitals have rates similar to the national averages:
  - In-hospital mortality following cholecystectomy (gall bladder removal)
  - Urinary tract infection after major surgery
  - Pneumonia after invasive vascular procedure (balloon angioplasty, insertion of cardiac pacemeaker, etc.)
- However, for three indicators, Rhode Island hospitals do not look as good as the national benchmarks:
  - Acute myocardial infarction (heart attack) after major surgery
  - Wound infection
  - Adverse effects and iatrogenic complications (complications resulting from medical care, e.g., gastrointestinal complications, heart complications, etc.)

We hope that the hospitals will take advantage of this statewide information to review their own experience, focusing on the indicators where our collective performance is below the national benchmarks. The Department of Health will continue tracking all 35 indicators, but will pay special attention to these ten, and to the three indicators where performance is below the national average. Together, we will continue improving the quality of health care in our hospitals.

SUMMARY REPORT: Hospital Care

I. Report Overview

This report compares the care provided to inpatients in hospitals in Rhode Island to national data during a recent five-year period (1994-1998). It presents indicators of quality for Rhode Island hospitals taken as a group compared to national figures. The purpose of the report is to compare the hospital care provided in the state to national norms and to provide background for later reports that will compare Rhode Island hospitals among themselves.

II. Project Background

In 1998 the Rhode Island General Assembly enacted R.I.G.L. 23-17.17.1 - The Health Care Quality Performance Measurement and Reporting Program. The law sets up a system for collecting and reporting performance measures relating to quality of care for licensed health care facilities in the state, beginning with hospitals. It requires the Department of Health to include (1) clinical performance measures that are risk-adjusted for patient variables and (2) comparable, statistically valid patient satisfaction measures.

In response, the Department has worked with hospitals and the Hospital Association of Rhode Island to establish (1) a system of clinical performance measures drawn from hospital medical records and (2) a single vendor for patient satisfaction surveys across all hospitals. These two efforts will compare hospitals in Rhode Island among themselves, in public reports that will be issued during 2001 and 2002.

The Department of Health is also investigating the use of an existing data system, the hospital discharge database, to produce comparative information on hospital quality. Using hospital discharge data is attractive because -

1. there would be few or no additional data collection costs to the hospitals and the Department,

2. the data cover the full range of hospital care, rather than the selected patient populations covered by the clinical measures from medical records, and

3. they allow for comparisons to national data and to state-level data in other states where similar data are collected.

Although more work is needed before these data can be used to compare individual hospitals, this report shows how the overall quality of hospital care in Rhode Island compares to the quality of care nationally. As quality indicators based on hospital discharge data improve, and as the underlying data are validated, this data source will provide additional measures of health care quality in our state's hospitals.

This **Summary Report: Hospital Care** has a companion technical report **Trends in Quality Indicators for Health Care in Rhode Island (1994-1998): Hospital Care, Access to Care and Utilization of Inpatient Procedures** that is available by request. Please see ordering instructions in Section VII.

III. Quality Indicators

The quality indicators used in this report were selected from the 35 indicators developed by the Healthcare Cost and Utilization Project (HCUP) of the federal Agency for Healthcare Research and Quality (AHRQ). The HCUP indicators can be computed from the hospital discharge data systems maintained in many states. Data from 22 of these state systems form the HCUP database, from which AHRQ computed the national quality indicators presented here. The Rhode Island indicators were computed from the Department of Health's statewide hospital discharge database, which includes data submitted regularly by each of the state's acute-care hospitals, using computer programs supplied by AHRQ.

The 35 HCUP quality indicators include indicators in three categories. There are 18 indicators of adverse outcomes of care, including in-hospital mortality and non-fatal complications such as pneumonia, infection, and venous thrombosis (blood clots). The are nine indicators showing the utilization of inpatient procedures that may be overused or underused. Finally, there are eight measures of access to care that identify hospitalizations that may result from inadequate ambulatory or primary care for certain conditions.

IV. Limitations of the Indicators

The information in this report must be used with caution, for two reasons. First, the values of the indicators may vary because they are applied to patient populations where the severity of illness differs from one group of hospital patients to another. For that reason the HCUP project recommends that they not be used to compare individual hospitals. However, it is less likely that such variation is important when the population of an entire state is involved, and in this report the indicators are being applied to the care provided by all the state's hospitals taken as a group.

The second reason for caution is that the data from which the indicators are generated come from information that hospitals generate primarily for billing health insurance plans. These data are called "administrative data" and they are typically collected and used without as much attention to their completeness, accuracy, and comparability as would be desired for measuring the quality of care provided by individual hospitals.

V. Indicators Selected for this Report

This report presents data on ten of the indicators of adverse outcomes for hospitals in Rhode Island compared to national rates. These ten indicators are straightforward to interpret because lower rates of adverse outcomes are always preferred. The quality indicators based on utilization are harder to interpret, as there is no consensus concerning the optimal utilization rates for these procedures. The quality indicators concerning access to care have also been excluded from this analysis, because they reflect problems in our medical care system that extend well beyond the hospitals' sphere of influence.

The ten chosen indicators include one measure of in-hospital mortality after a specific surgical procedure. Because the number of deaths for each procedure during a year is small even when all hospitals in the state are grouped, these data require special care in their statistical interpretation. Six of the elected indicators cover specific complications after major surgery of all types. For these indicators, the number of adverse outcomes is relatively large, and the six

indicators taken together reflect one aspect of the quality of inpatient surgical care. The final three indicators are the rates of specific types of complications for two large groups of patients - wound infections or unintended medical complications among all inpatients, and obstetrical complications among all women giving birth. In both cases, the number of adverse outcomes is sufficiently large to provide statistical reliability.

The indicators selected for this Report include:

- **In-hospital mortality following cholecystectomy (gall bladder removal)**
- **Pulmonary compromise (lung congestion, breathing difficulties) after major surgery**
- **Acute myocardial infarction (heart attack) after major surgery**
- **Gastrointestinal hemorrhage or ulceration (bleeding or hole in the lining of the stomach or bowel) after major surgery**
- **Venous thrombosis or pulmonary embolism (blood clots in the veins or lungs) after major surgery**
- **Urinary tract infection after major surgery**
- **Pneumonia after invasive vascular procedure (balloon angioplasty, insertion of cardiac pacemaker, etc.)**
- **Obstetrical complications (bleeding or severe tears after delivering a baby, etc.)**
- **Wound infection**
- **Adverse effects and iatrogenic complications (complications resulting from medical care)**

VI. Indicators

This section provides two ways of looking at the 10 indicators profiled in this Report. The **Summary Table** covers all 10 indicators and presents the preferred trend for the rate, the Rhode Island trend, the Rhode Island rate compared to the national rates available, and comments relevant to the interpretation of the rate.

In addition to the display in the Summary Table each individual indicator can be viewed for more information on:

- the way the indicator is calculated
- which cases are included in the calculation
- the indicator's relationship to quality
- what the Rhode Island trend means.

Also included on each indicator page is a graph displaying the Rhode Island rates for the period 1994-1998 connected by a trend line and an 'X' indicating the national comparative rates.

How to interpret the graphs

Rhode Island Data: The line connects the five black dots that stand for the rate of occurrence in Rhode Island each year from 1994 through 1998. If the line is slanting upwards, the rate is generally increasing. If the line is slanting downwards, the rate is generally decreasing.

National Data: The points marked by an 'X' are the rates of occurrence in the United States. These are not available for all five years and so are not connected by a line.

Comparing Rhode Island Data and National Data: The five vertical lines (showing the 95% confidence intervals) that pass through the annual data points for Rhode Island show how much the Rhode Island rates might vary from year to year, based on chance alone, since many rates for Rhode Island are based on small numbers. If one of these lines passes through the data point for the national rate in any year, that means that any difference between the Rhode Island rate and the national rate in that year may be due to chance alone, rather than an actual difference in quality of care.

Summary Table: What it tells you

Indicator Label: Displays the name of the indicator with common terms for medical conditions.

Preferred Trend: Displays an arrow indicating the direction we would like to see the rate trend going.

Rhode Island Trend: Displays the trend for the Rhode Island rate; rates that have no obvious trend display a horizontal arrow.

Rhode Island rate vs. national rate: Displays the 3 years for which there may be comparative national rates-1994, 1996 and 1997. The **legend** used in the **Summary Table** is as follows:

♦ ♦ ♦	Means that the Rhode Island rate is **better** than the national comparative rate.
♦ ♦	Means that the Rhode Island rate is **about the same** as the national comparative rate.
♦	Means that the Rhode Island rate is **not as good** as the national comparative rate.
*	Means that there is no comparative national rate available.

Note: All results showing the Rhode Island rate to be either **better** than (3 diamonds) or **not as good** as (1 diamond) the national comparative are based on comparisons of the national rate with the **95% confidence interval** around the Rhode Island rate. The 95% confidence interval reflects the statistical uncertainty in the measured rate that arises whenever rates are based on small numbers of cases, as is often true in Rhode Island data.

Indicator Name	Preferred Trend	Rhode Island Trend	Rhode Island Rates vs. National Rates			Critical Comments
			1994	1996	1997	
Mortality						
In-hospital mortality following chole-cystectomy (gall bladder removal)	↓	↑	♦ ♦	♦ ♦	♦ ♦	Death following this procedure is an extremely rare event; the Rhode Island trend is increasing primarily due to the fact that more gall bladder surgeries are taking place on an outpatient basis and only the most vulnerable patients would be hospitalized for this procedure.
Surgery Complications						
Pulmonary compromise (lung congestion, breathing difficulties) after major surgery	↓	↔	*	*	♦ ♦ ♦	
Acute myocardial infarction (heart attack) after major surgery	↓	↔	*	*	♦	
Gastrointestinal hemorrhage or ulceration (bleeding or hole in the lining of the stomach or bowel) after major surgery	↓	↔	*	*	♦ ♦ ♦	
Venous thrombosis or pulmonary embolism (blood clots in the veins or lungs) after major surgery	↓	↔	*	*	♦ ♦ ♦	
Urinary tract infection after major surgery	↓	↔	*	*	♦ ♦	
Pneumonia after invasive vascular procedure	↓	↔	*	*	♦ ♦	

Indicator Name	Preferred Trend	Rhode Island Trend	Rhode Island Rates vs. National Rates			Critical Comments
			1994	1996	1997	
Specific Complications						
Obstetrical complications (bleeding or severe tears after delivering a baby, etc.)	↓	↓	♦ ♦ ♦	♦ ♦ ♦	♦ ♦ ♦	
Wound infection	↓	↑	♦ ♦	♦	♦	
Adverse effects and iatrogenic complications (complications resulting from medical care)	↓	↔	♦	♦	♦	

VII. For Additional Information

If you would like more information or have questions about this Summary Report: Hospital Care, please call Gina Rocha, RN, MPH, Department of Health at 401-222-2901 or email to GinaR@doh.state.ri.us. A copy of the full Technical Report can also be requested by calling this number.

TABLES AND CHARTS

FOR

INDIVIDUAL QUALITY INDICATORS

Indicator[1]: In-hospital mortality following cholecystectomy (gall bladder removal)

How do we calculate this measure? Number of deaths per 1,000 patients receiving a cholecystectomy (gall bladder removal).

Which patients are in the calculation? All adult discharges (excluding pregnant women) with a diagnosis of non-acute, uncomplicated cholecystitis (inflammation) and/or cholelithiasis (gall stones).

Why should we look at this rate? All surgery entails some risk; however, mortality following common elective procedures for uncomplicated cases should rarely occur. By observing trends in mortality rates for elective procedures, it may be possible to target areas requiring more in-depth analysis or quality improvement efforts.

What do the Rhode Island trends tell us? Mortality following gall bladder surgery is a very rare event. The five years for which we computed Rhode Island rates (1994-1998) show an increasing trend due largely to the fact that this procedure is more frequently performed on an outpatient basis, leaving only the sickest patients admitted to the hospital for the procedure.
Rhode Island rates do not differ significantly from national rates for any of the three years for which we have national comparative data.

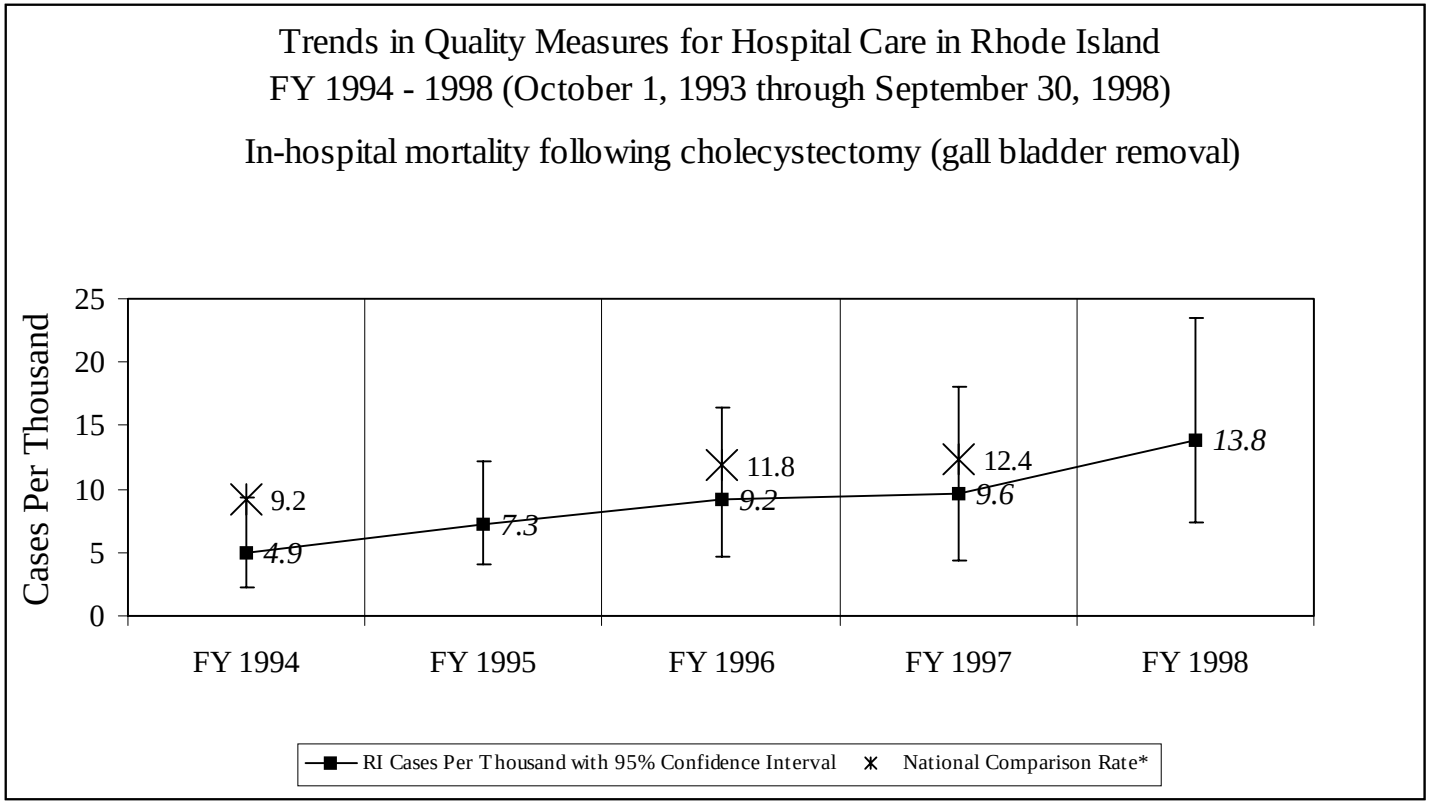
How to interpret the graphs

Rhode Island Data: The line connects the five black dots that stand for the rate of occurrence in Rhode Island each year from 1994 through 1998. If the line is slanting upwards, the rate is generally increasing. If the line is slanting downwards, the rate is generally decreasing.

National Data: The points marked by an 'X' are the rates of occurrence in the United States. These are not available for all five years and so are not connected by a line.

Comparing Rhode Island Data and National Data: The five vertical lines (showing the 95% confidence intervals) that pass through the annual data points for Rhode Island show how much the Rhode Island rates might vary from year to year, based on chance alone, since many rates for Rhode Island are based on small numbers. If one of these lines passes through the data point for the national rate in any year, that means that any difference between the Rhode Island rate and the national rate in that year may be due to chance alone, rather than an actual difference in quality of care.

[1]Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project (HCUP). [See www.ahrq.gov/data/hcup/.] Definitions of Quality Indicators by detailed disease and procedure codes are available from HCUP on request.



*The National Comparison Rate is based on calendar year data.

Measure Description: **In-hospital mortality following cholecystectomy**	**FY 1994**	**FY 1995**	**FY 1996**	**FY 1997**	**FY 1998**	**Overall 5-Year Rate**
RI Computed Rate (as Cases per Thousand)	4.9	7.3	9.2	9.6	13.8	8.2
95% Confidence Interval	(2.3 - 9.3)	(4.0 - 12.2)	(4.6 - 16.4)	(4.4 - 18.1)	(7.4 - 23.6)	(6.1 - 10.4)
Total patients with this condition (Numerator)	9	14	11	9	13	56
Total patients at risk for this condition (Denominator)	1,825	1,918	1,197	940	939	6,819
Direction Of Trend	Linear Increase					

Indicator[1]: Pulmonary compromise (lung congestion, breathing difficulties) after major surgery

How do we calculate this measure? Number of pulmonary complications per 1,000 major surgical procedures**.**

Which patients are in the calculation? All adults with major surgery on day 1 or 2 of admission. Excludes discharges for respiratory, cardiovascular conditions and pregnant women.

Why should we look at this rate? Although patients who receive general anesthesia are at risk for subsequent pulmonary complications (congestion, breathing difficulties), meticulous post-operative care should prevent such occurrences. This indicator identifies diagnoses that suggest a possible complication resulting from treatment in the hospital. It is presumed that patients with these cardiorespiratory conditions on admission will not receive surgery immediately after admission. Thus, if one of these conditions is coded and surgery occurs early in the hospitalization, it is very likely that the condition occurred as a complication of treatment.

What do the Rhode Island trends tell us? The five years for which we computed RI rates (1994-1998) show no statistical trend. Rhode Island is significantly lower than the 1997 national comparative rate, the only national comparative rate available.

How to interpret the graphs

Rhode Island Data: The line connects the five black dots that stand for the rate of occurrence in Rhode Island each year from 1994 through 1998. If the line is slanting upwards, the rate is generally increasing. If the line is slanting downwards, the rate is generally decreasing.

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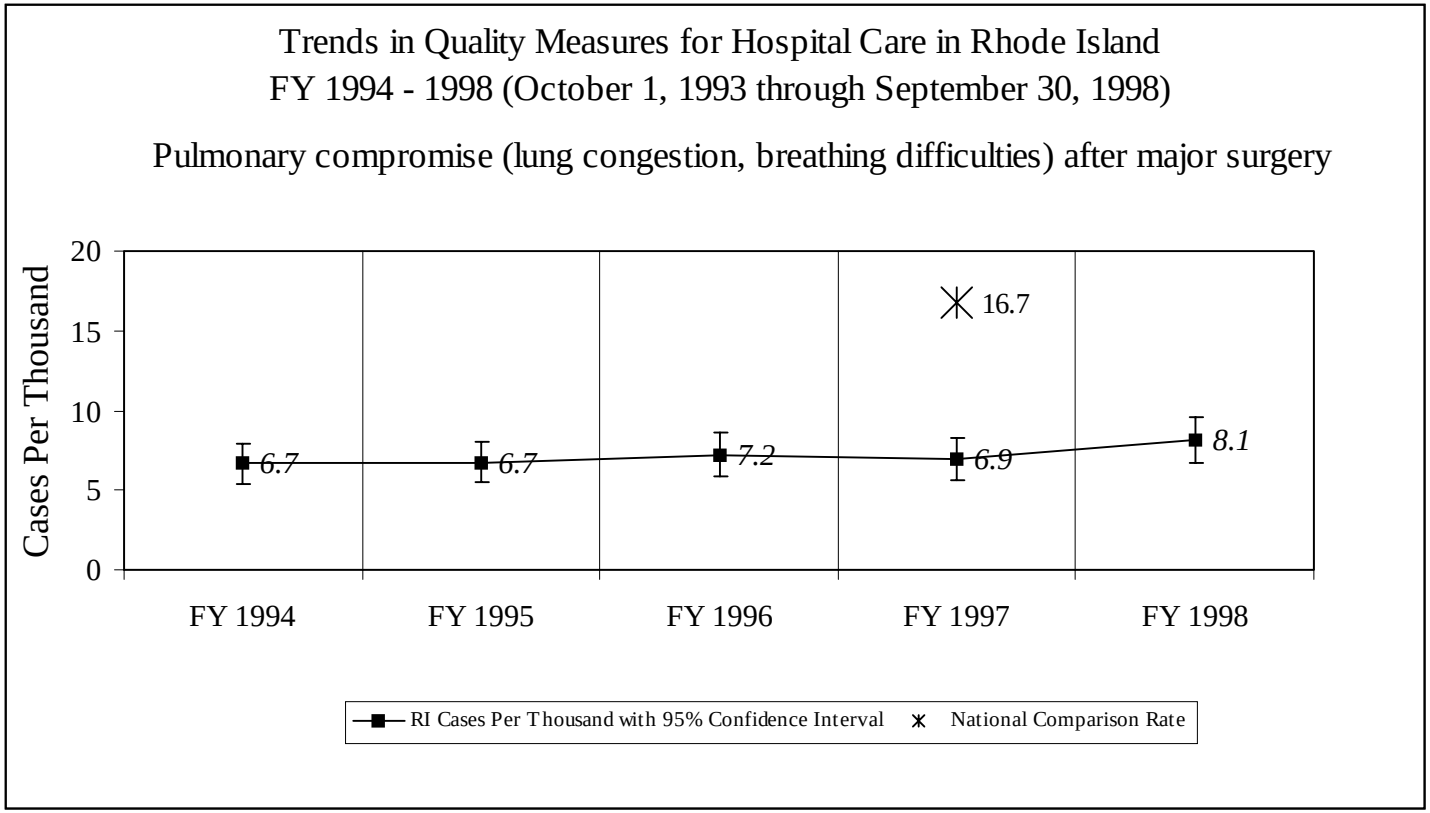

*The National Comparison Rate is based on calendar year data.

Measure Description: **Pulmonary compromise after major surgery**	**FY 1994**	**FY 1995**	**FY 1996**	**FY 1997**	**FY 1998**	**Overall 5-Year Rate**
RI Computed Rate (as Cases per Thousand)	6.7	6.7	7.2	6.9	8.1	7.1
95% Confidence Interval	(5.4 - 7.9)	(5.5 - 8.0)	(5.9 - 8.6)	(5.6 - 8.3)	(6.7 - 9.6)	(6.5 - 7.7)
Total patients with this condition (Numerator)	108	109	111	104	122	554
Total patients at risk for this condition (Denominator)	16,171	16,163	15,330	14,984	15,028	77,676
Direction Of Trend:	No Trend					

Indicator[1]: Acute myocardial infarction (heart attack) after major surgery

How do we calculate this measure? Number of myocardial infarctions per 1,000 procedures**.**

Which patients are in the calculation? All adult discharges with major surgery on day 1 or 2 of admission. Excludes discharges for cardiovascular conditions and pregnant women.

Why should we look at this rate? The risk of surgery-related heart attack increases for patients with existing cardiac conditions, age greater than 70 years, and poor medical condition. A heart attack after surgery may indicate that patients were inadequately screened prior to surgery or that they experienced substandard care during or following surgery. This indicator identifies diagnoses or procedures that suggest a possible complication resulting from treatment in the hospital. It is presumed that patients with these cardiorespiratory conditions on admission will not receive surgery immediately after admission. Thus, if one of these conditions is coded and surgery occurs early in the hospitalization, it is very likely that the condition occurred as a complication of treatment.

What do the Rhode Island trends tell us? The five years for which we computed RI rates (1994-1998) show no statistical trend. RI is significantly higher than the 1997 national comparative rate.

How to interpret the graphs

Rhode Island Data: The line connects the five black dots that stand for the rate of occurrence in Rhode Island each year from 1994 through 1998. If the line is slanting upwards, the rate is generally increasing. If the line is slanting downwards, the rate is generally decreasing.

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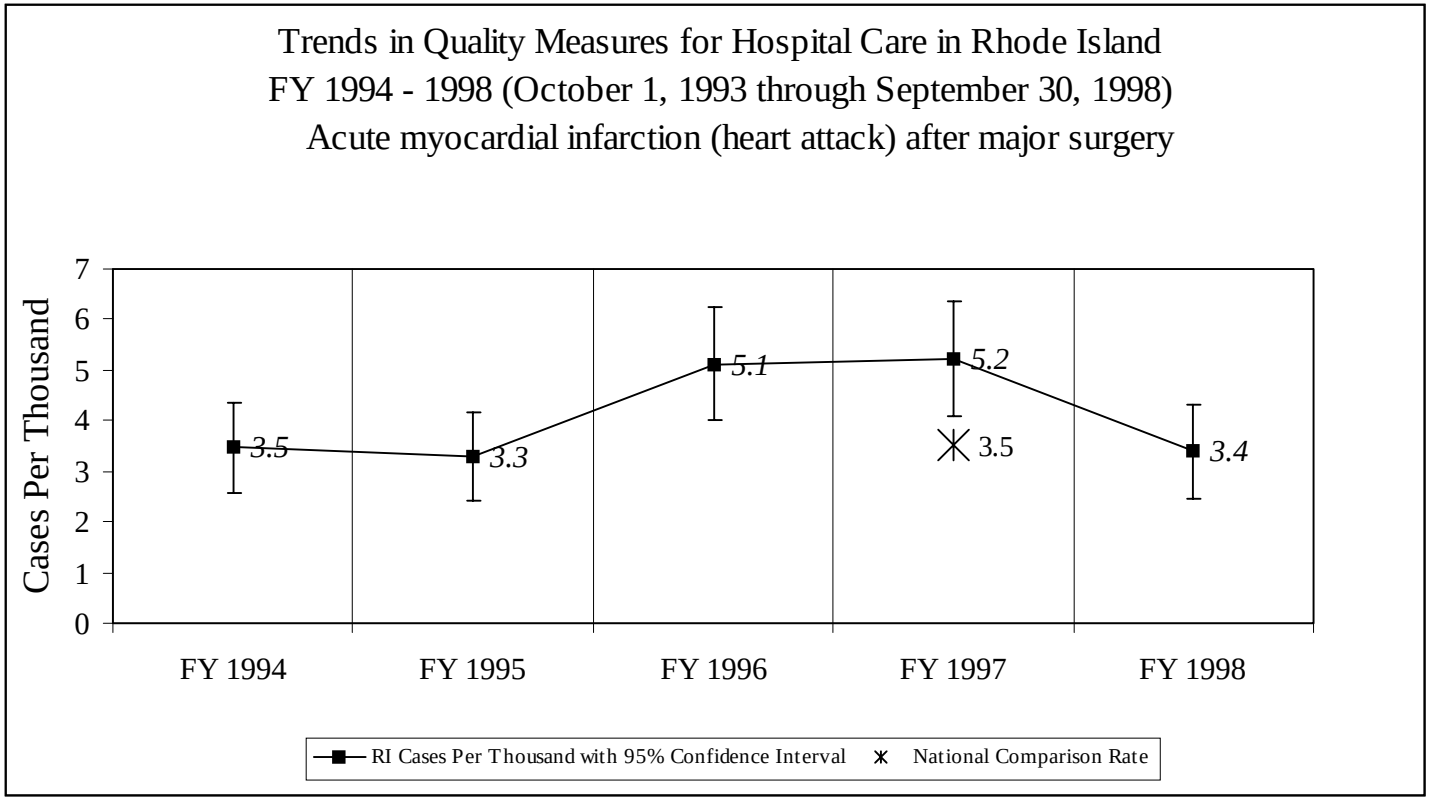

*The National Comparison Rate is based on calendar year data.

Measure Description: **Acute myocardial infarction after major surgery**	**FY 1994**	**FY 1995**	**FY 1996**	**FY 1997**	**FY 1998**	**Overall 5-Year Rate**
RI Computed Rate (as Cases per Thousand)	3.5	3.3	5.1	5.2	3.4	4.1
95% Confidence Interval	(2.6 - 4.4)	(2.4 - 4.2)	(4.0 - 6.2)	(4.1 - 6.4)	(2.5 - 4.3)	(3.6 - 4.5)
Total patients with this condition (Numerator)	57	54	80	80	52	323
Total patients at risk for this condition (Denominator)	16,447	16,454	15,612	15,303	15,346	79,162
Direction Of Trend:	No Trend					

Indicator[1]: Gastrointestinal hemorrhage or ulceration (bleeding or hole in the lining of the stomach or bowel) after major surgery

How do we calculate this measure? Number of gastrointestinal hemorrhages or ulcerations per 1,000 major surgical procedures**.**

Which patients are in the calculation? All adult discharges with major surgery on day 1 or 2 of admission. Excludes discharges for gastrointestinal and hepatobiliary conditions and pregnant women.

Why should we look at this rate? Irritation to the lining of the stomach or duodenum (small intestine) can occur in surgical patients as a result of medications, excessive secretion of gastric acid, and other factors. Gastrointestinal hemorrhage or ulceration (severe irritation of the lining of the stomach or bowel) can be prevented under most circumstances through prophylactic use of medication that coats the stomach lining or that inhibits the secretion of gastric acid. This indicator identifies diagnoses or procedures that suggest a possible complication resulting from treatment in the hospital. Patients with hemorrhage or ulceration on admission will not receive surgery immediately after admission. Thus, if one of these conditions is coded and surgery occurs early in the hospitalization, it is very likely that the condition occurred as a complication of treatment.

What do the Rhode Island trends tell us? This is a fairly rare occurrence with rates based on very few complications. The five years for which we computed Rhode Island rates (1994-1998) show no statistical trend. Rhode Island is significantly lower than the 1997 national rate, the only comparative rate available.

How to interpret the graphs

Rhode Island Data: The line connects the five black dots that stand for the rate of occurrence in Rhode Island each year from 1994 through 1998. If the line is slanting upwards, the rate is generally increasing. If the line is slanting downwards, the rate is generally decreasing.

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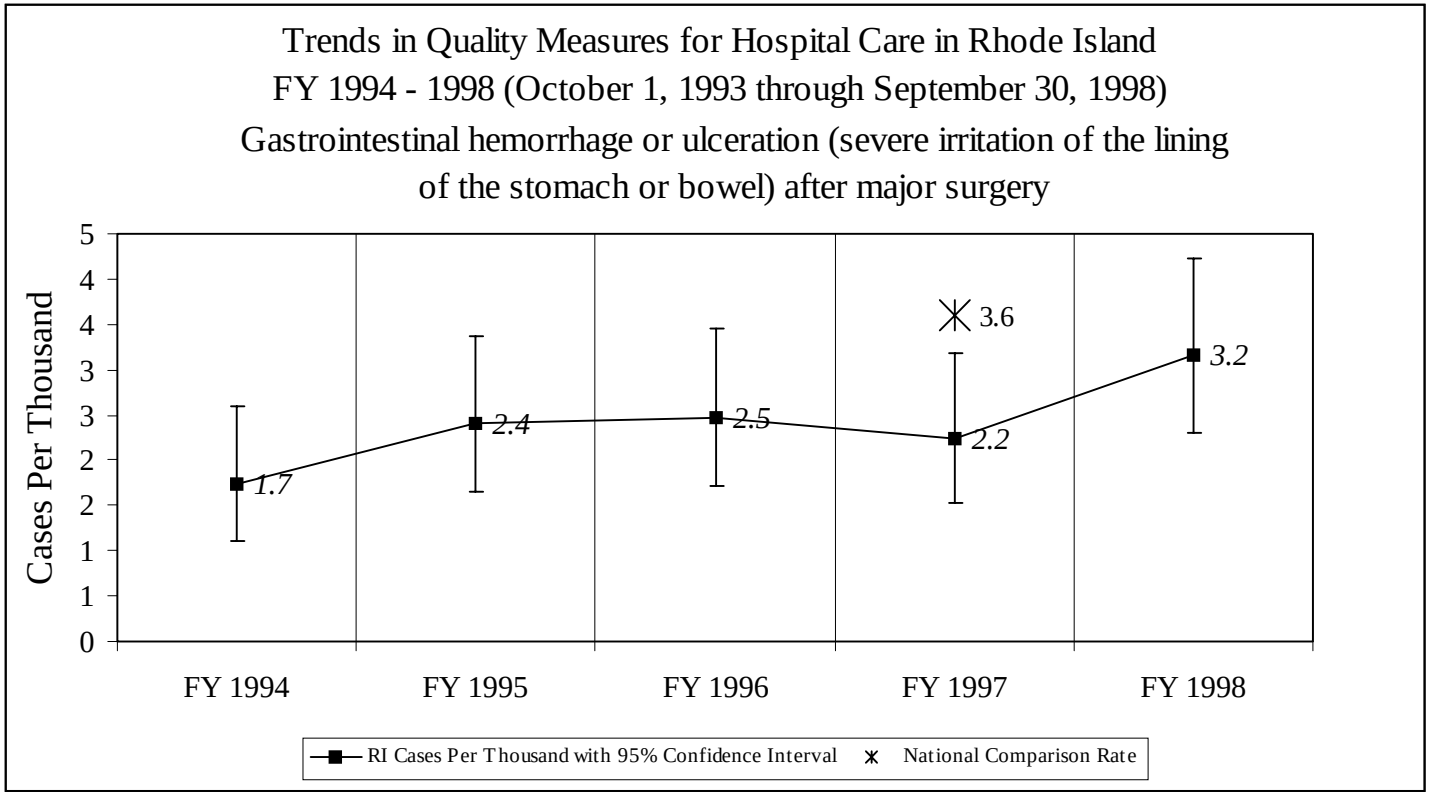

*The National Comparison Rate is based on calendar year data.

Measure Description: **Gastrointestinal hemorrhage or ulceration after major surgery**	**FY 1994**	**FY 1995**	**FY 1996**	**FY 1997**	**FY 1998**	**Overall 5-Year Rate**
RI Computed Rate (as Cases per Thousand)	1.7	2.4	2.5	2.2	3.2	2.4
95% Confidence Interval	(1.1 - 2.6)	(1.7 - 3.4)	(1.7 - 3.4)	(1.5 - 3.2)	(2.3 - 4.2)	(2.0 - 2.8)
Total patients with this condition (Numerator)	24	33	34	31	44	166
Total patients at risk for this condition (Denominator)	13,760	13,705	13,783	13,843	13,937	69,028
Direction Of Trend	No Trend					

Indicator[1]: Venous thrombosis or pulmonary embolism (blood clots in the veins or lungs) after major surgery

How do we calculate this measure? Number of venous thrombosis or pulmonary embolisms per 1,000 major surgical procedures.

Which patients are in the calculation? All adult discharges with major surgery or procedure on day 1 or 2 of admission. Excludes discharges with venous thrombosis as principal diagnosis; also excludes pregnant women.

Why should we look at this rate? Blood clots in the deep veins (venous thrombosis) can dislodge and travel in the circulation to the lung, causing blockage of the pulmonary circulation (pulmonary embolism). Post-operative patients are at particular risk due to immobility, tissue damage from surgery, and medications. Although patients who receive general anesthesia are at risk for such complications, meticulous post-operative care should prevent most such occurrences. This indicator identifies diagnoses or procedures that suggest a possible complication resulting from treatment in the hospital. Patients with venous thrombosis or pulmonary embolism on admission normally will not receive surgery or major invasive procedures immediately after admission. Thus, if one of these conditions is coded and surgery occurs early in the hospitalization, it is very likely that the condition occurred as a complication of treatment.

What do the Rhode Island trends tell us? The five years for which we computed Rhode Island rates (1994-1998) show no statistical trend. Rhode Island is significantly lower than the 1997 national rate, the only comparative rate available.

How to interpret the graphs

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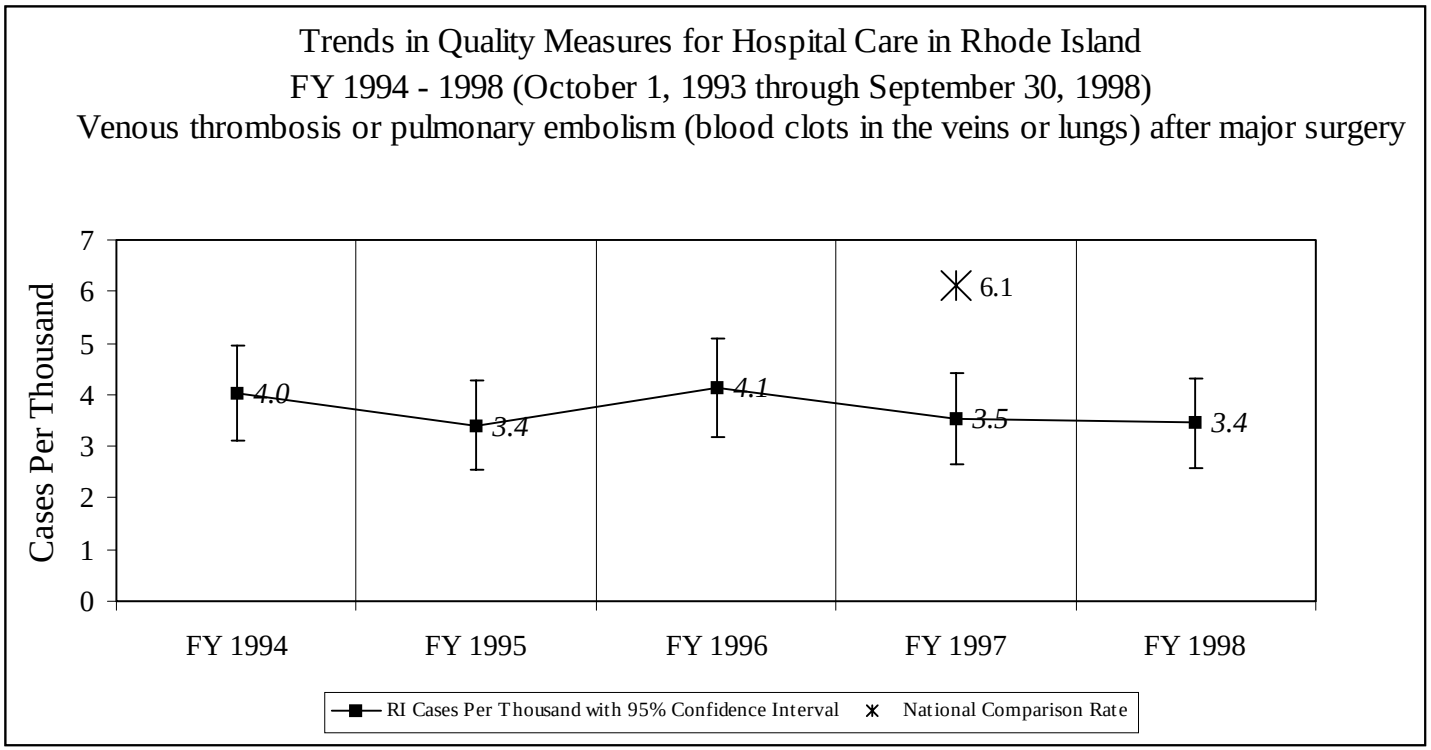


*The National Comparison Rate is based on calendar year data.

Measure Description: **Venous thrombosis or pulmonary embolism after major surgery**	**FY 1994**	**FY 1995**	**FY 1996**	**FY 1997**	**FY 1998**	**Overall 5-Year Rate**
RI Computed Rate (as Cases per Thousand)	4.0	3.4	4.1	3.5	3.4	3.7
95% Confidence Interval	(3.1 - 5.0)	(2.6 - 4.3)	(3.2 - 5.1)	(2.6 - 4.4)	(2.6 - 4.3)	(3.3 - 4.1)
Total patients with this condition (Numerator)	72	61	71	60	59	323
Total patients at risk for this condition (Denominator)	17,874	17,906	17,226	17,018	17,107	87,131
Direction Of Trend	No Trend					

Indicator[1]: Urinary tract infection after major surgery

How do we calculate this measure? Number of urinary tract infections per 1,000 major surgical procedures.

Which patients are in the calculation? All adult discharges with major surgery on day 1 or 2 of admission. Excludes discharges for renal, male genital and female genital conditions as well as pregnant women.

Why should we look at this rate? Infections of the urinary tract can result from catheterization of the urinary bladder to monitor surgical patients' output of fluids. Although patients who receive anesthesia and catheterization are at risk for subsequent urinary tract infections, meticulous post-operative care should prevent most such occurrences. This indicator identifies diagnoses or procedures that suggest a possible complication resulting from treatment in the hospital. Patients with urinary tract infections on admission normally will not receive surgery or major invasive procedures immediately after admission. Thus, if one of these conditions is coded and surgery occurs early in the hospitalization, it is very likely that the condition occurred as a complication of treatment.

What do the Rhode Island trends tell us? The five years for which we computed Rhode Island rates (1994-1998) show no statistical trend. Rhode Island is similar to the 1997 national comparative data.

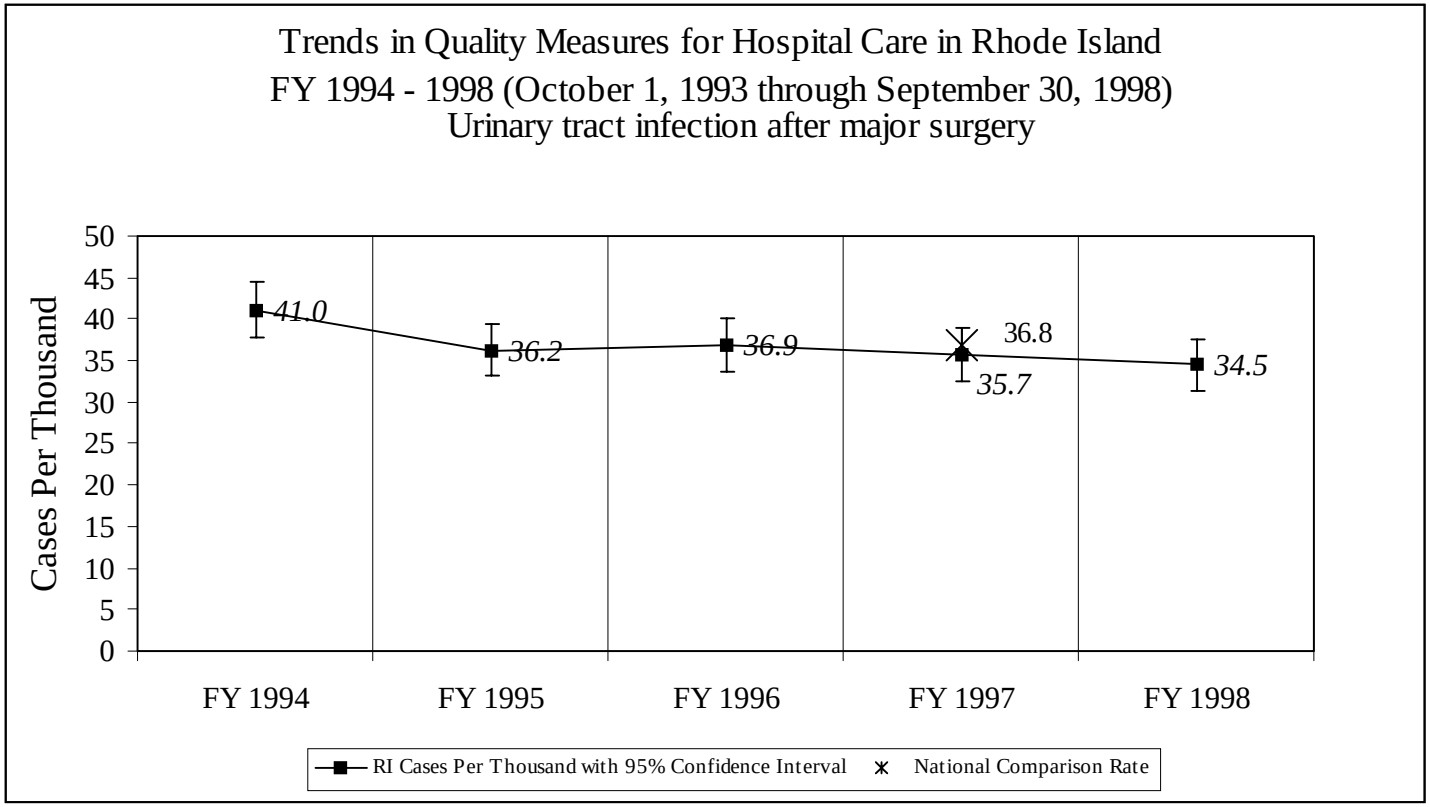
How to interpret the graphs

Rhode Island Data: The line connects the five black dots that stand for the rate of occurrence in Rhode Island each year from 1994 through 1998. If the line is slanting upwards, the rate is generally increasing. If the line is slanting downwards, the rate is generally decreasing.

National Data: The points marked by an 'X' are the rates of occurrence in the United States. These are not available for all five years and so are not connected by a line.

Comparing Rhode Island Data and National Data: The five vertical lines (showing the 95% confidence intervals) that pass through the annual data points for Rhode Island show how much the Rhode Island rates might vary from year to year, based on chance alone, since many rates for Rhode Island are based on small numbers. If one of these lines passes through the data point for the national rate in any year, that means that any difference between the Rhode Island rate and the national rate in that year may be due to chance alone, rather than an actual difference in quality of care.

[1]Source: Agency for Healthcare Research and Quality, Healthcare Cost and Utilization Project (HCUP). [See www.ahrq.gov/data/hcup/.] Definitions of Quality Indicators by detailed disease and procedure codes are available from HCUP on request.



*The National Comparison Rate is based on calendar year data.

Measure Description: **Urinary tract infection after major surgery**	**FY 1994**	**FY 1995**	**FY 1996**	**FY 1997**	**FY 1998**	**Overall 5-Year Rate**
RI Computed Rate (as Cases per Thousand)	41.0	36.2	36.9	35.7	34.5	36.9
95% Confidence Interval	(37.7 - 44.4)	(33.1 - 39.4)	(33.6 - 40.1)	(32.5 - 38.9)	(31.4 - 37.6)	(35.5 - 38.3)
Total patients with this condition (Numerator)	559	491	483	461	451	2,445
Total patients at risk for this condition (Denominator)	13,621	13,557	13,104	12,901	13,081	66,264
Direction Of Trend	No Trend					

Indicator[1]: Pneumonia after invasive vascular procedure (balloon angioplasty, insertion of cardiac pacemeaker, etc.)

How do we calculate this measure? Number of patients developing pneumonia per 1,000 invasive vascular procedures**.**

Which patients are in the calculation? All adults with a vascular procedure on day 1 or 2 following admission. Excludes discharges with cancer, diseases or disorders of the respiratory system, or with diagnoses or procedures indicating compromised immune status or AIDS. Also excludes pregnant women and newborns.

Why should we look at this rate? Patients with invasive vascular procedures are at particular risk for post-operative pneumonia (acute inflammation of the lung). Pneumonia usually results from immobility, inadequately treated partial collapse of lung tissue, or contamination of the airway through aspiration. Although patients who receive general anesthesia are at risk for pneumonia, meticulous post-operative care should prevent most such occurrences. This indicator identifies diagnoses or procedures that suggest a possible complication resulting from treatment in the hospital. Patients with pneumonia on admission normally will not receive invasive procedures immediately after admission. Thus, if one of these conditions is coded and surgery occurs early in the hospitalization, it is very likely that the condition occurred as a complication of treatment.

What do the Rhode Island trends tell us? The five years for which we computed Rhode Island rates (1994-1998) show no statistical trend. Rhode Island is similar to the 1997 national data, the only comparative rate available.

How to interpret the graphs

Rhode Island Data: The line connects the five black dots that stand for the rate of occurrence in Rhode Island each year from 1994 through 1998. If the line is slanting upwards, the rate is generally increasing. If the line is slanting downwards, the rate is generally decreasing.

National Data: The points marked by an 'X' are the rates of occurrence in the United States. These are not available for all five years and so are not connected by a line.

Comparing Rhode Island Data and National Data: The five vertical lines (showing the 95% confidence intervals) that pass through the annual data points for Rhode Island show how much the Rhode Island rates might vary from year to year, based on chance alone, since many rates for Rhode Island are based on small numbers. If one of these lines passes through the data point for the national rate in any year, that means that any difference between the Rhode Island rate and the national rate in that year may be due to chance alone, rather than an actual difference in quality of care.

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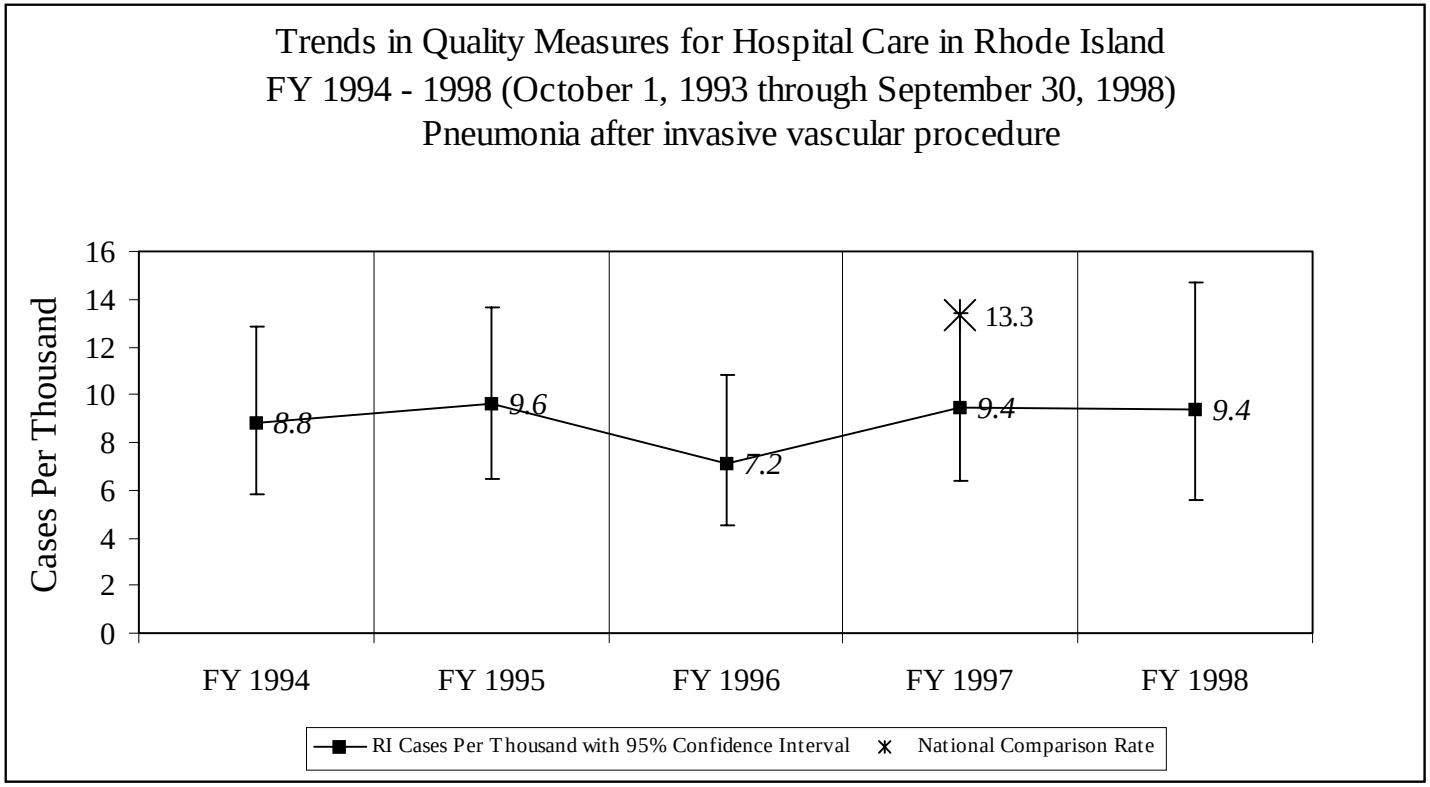

*The National Comparison Rate is based on calendar year data.

Measure Description: **Pulmonary compromise after invasive vascular procedure**	**FY 1994**	**FY 1995**	**FY 1996**	**FY 1997**	**FY 1998**	**Overall 5-Year Rate**
RI Computed Rate (as Cases per Thousand)	8.8	9.6	7.2	9.4	9.4	8.8
95% Confidence Interval	(5.8 - 12.8)	(6.5 - 13.7)	(4.5 - 10.8)	(6.4 - 13.4)	(5.6 - 14.7)	(7.3 - 10.4)
Total patients with this condition (Numerator)	27	30	22	30	18	127
Total patients at risk for this condition (Denominator)	3,056	3,125	3,077	3,179	1,924	14,361
Direction Of Trend	No Trend					

Indicator[1]: Obstetrical complications (bleeding or severe tears after delivering a baby, etc.)

How do we calculate this measure? Number of obstetrical complications per 1,000 women hospitalized for a delivery.

Which patients are in the calculation? All women who deliver.

Why should we look at this rate? Obstetrical complications (postpartum hemorrhage, fourth degree lacerations, etc.) contribute to maternal, fetal, and neonatal complications and death. In 1987, there were 220 hospitalizations for obstetrical complications prior to delivery per 1,000 deliveries. Such complications are considered largely preventable through routine prenatal care and appropriate obstetrical care.

What do the Rhode Island trends tell us? The five years for which we computed Rhode Island rates (1994-1998) show a near linear decrease, meaning the rates are decreasing in a relatively stable fashion. The Rhode Island rates are significantly lower for all three years for which we have national comparative data.

How to interpret the graphs

Rhode Island Data: The line connects the five black dots that stand for the rate of occurrence in Rhode Island each year from 1994 through 1998. If the line is slanting upwards, the rate is generally increasing. If the line is slanting downwards, the rate is generally decreasing.

National Data: The points marked by an 'X' are the rates of occurrence in the United States. These are not available for all five years and so are not connected by a line.

Comparing Rhode Island Data and National Data: The five vertical lines (showing the 95% confidence intervals) that pass through the annual data points for Rhode Island show how much the Rhode Island rates might vary from year to year, based on chance alone, since many rates for Rhode Island are based on small numbers. If one of these lines passes through the data point for the national rate in any year, that means that any difference between the Rhode Island rate and the national rate in that year may be due to chance alone, rather than an actual difference in quality of care.

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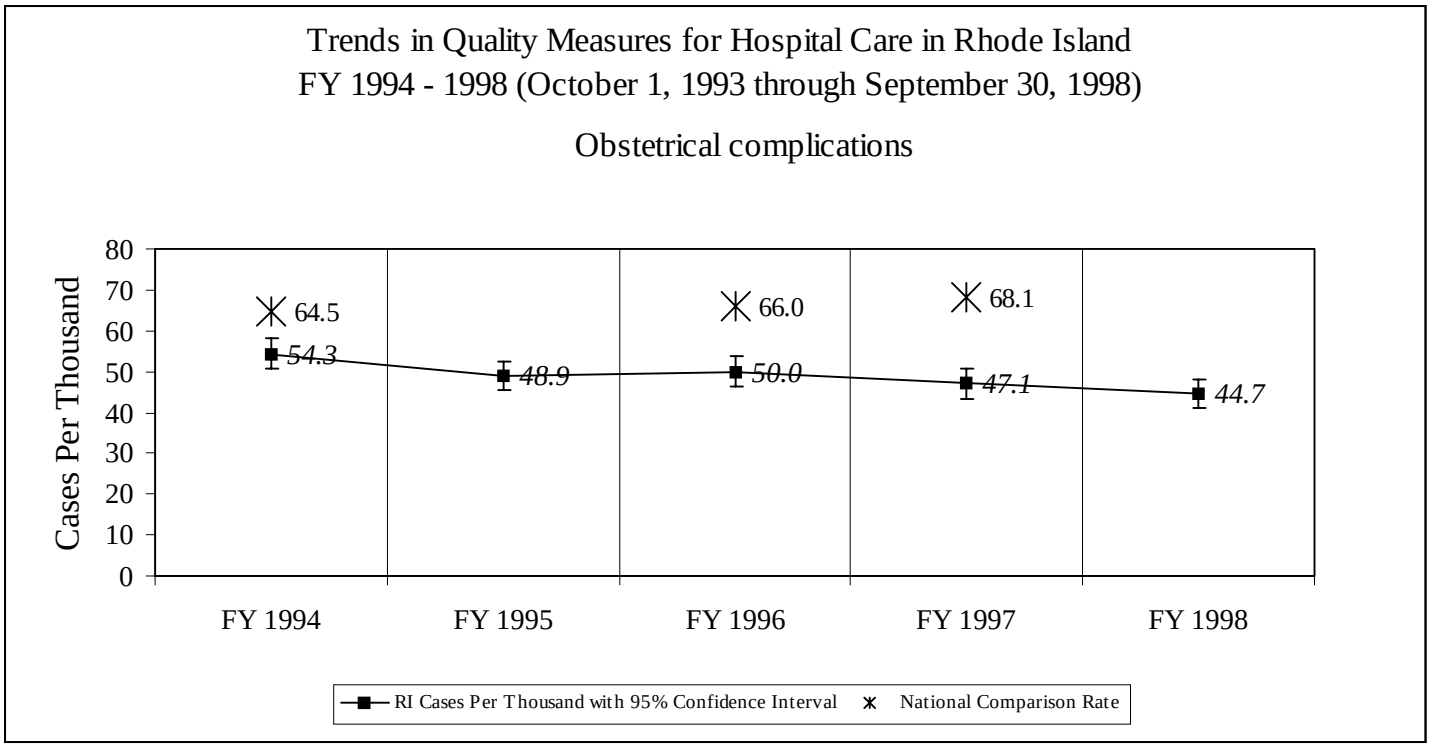

*The National Comparison Rate is based on calendar year data.

Measure Description: **Obstetrical complications**	**FY 1994**	**FY 1995**	**FY 1996**	**FY 1997**	**FY 1998**	**Overall 5-Year Rate**
RI Computed Rate (as Cases per Thousand)	54.3	48.9	50.0	47.1	44.7	49.1
95% Confidence Interval	(50.6 - 58.0)	(45.3 - 52.5)	(46.3 - 53.7)	(43.5 - 50.7)	(41.2 - 48.2)	(47.5 - 50.7)
Total patients with this condition (Numerator)	773	666	666	617	586	3,308
Total patients at risk for this condition (Denominator)	14,233	13,626	13,330	13,100	13,107	67,396
Direction Of Trend	Linear Decrease					

Indicator[1]: Wound infection

How do we calculate this measure? Number of wound infections per 1,000 patients.

Which patients are in the calculation? All hospital discharges.

Why should we look at this rate? Surgical and trauma wounds are often contaminated with bacteria; however, for some types of wounds strict surgical aseptic technique and appropriate antibiotic therapy can reduce the chance of wound infections. This indicator identifies diagnoses or procedures that suggest a possible complication resulting from treatment in the hospital. All cases in the hospital are screened for these conditions.

What do the Rhode Island trends tell us? The five years for which we computed Rhode Island rates (1994-1998) show a linear increase, meaning the rates are increasing in a statistically stable fashion. The majority of the cases developing wound infections are among patients age 65 and older, among whom there may be comorbidities not accounted for in the rates. The three years for which we have national comparative data show Rhode Island significantly higher in two of the three years.

How to interpret the graphs

Rhode Island Data: The line connects the five black dots that stand for the rate of occurrence in Rhode Island each year from 1994 through 1998. If the line is slanting upwards, the rate is generally increasing. If the line is slanting downwards, the rate is generally decreasing.

National Data: The points marked by an 'X' are the rates of occurrence in the United States. These are not available for all five years and so are not connected by a line.

Comparing Rhode Island Data and National Data: The five vertical lines (showing the 95% confidence intervals) that pass through the annual data points for Rhode Island show how much the Rhode Island rates might vary from year to year, based on chance alone, since many rates for Rhode Island are based on small numbers. If one of these lines passes through the data point for the national rate in any year, that means that any difference between the Rhode Island rate and the national rate in that year may be due to chance alone, rather than an actual difference in quality of care.

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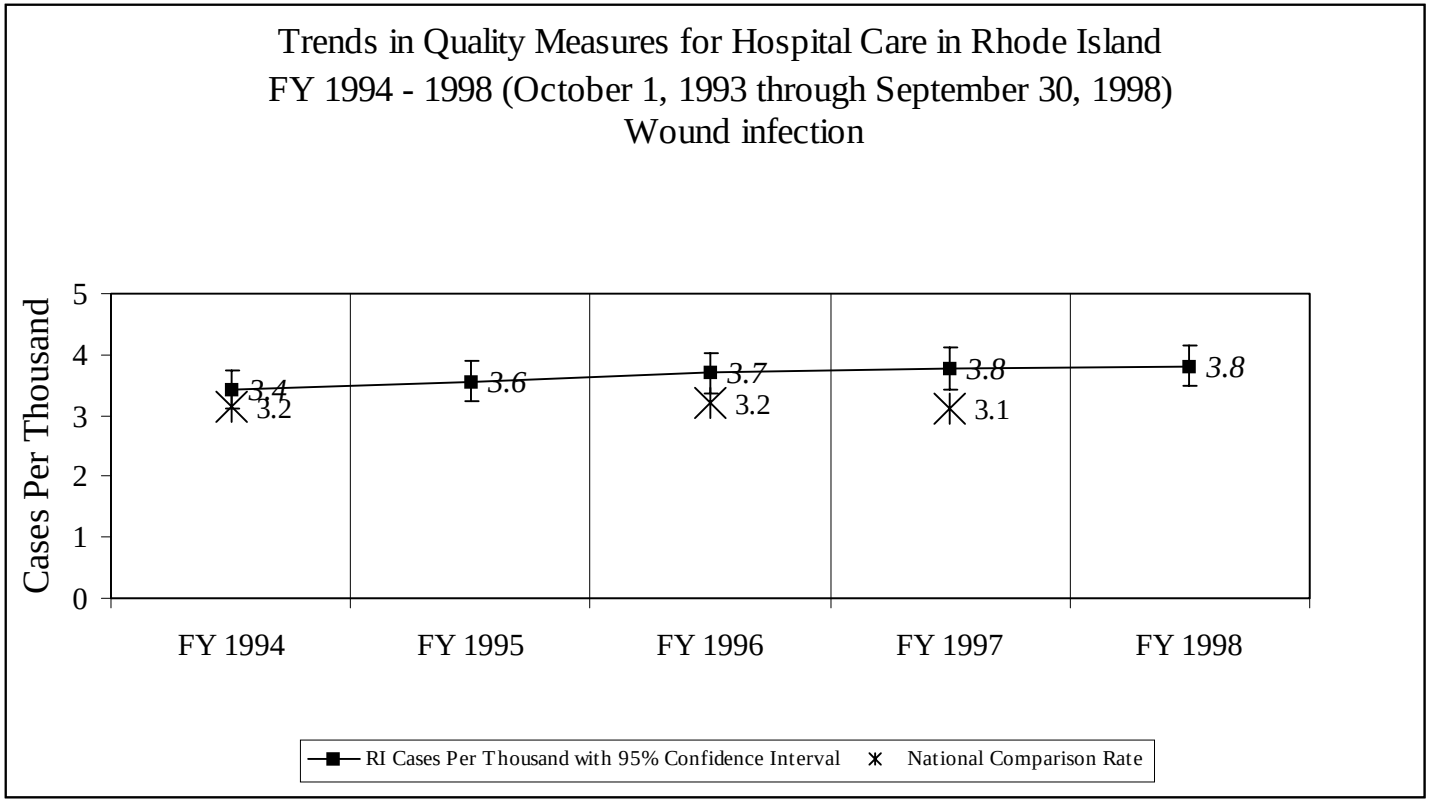

*The National Comparison Rate is based on calendar year data.

Measure Description: **Wound infection**	**FY 1994**	**FY 1995**	**FY 1996**	**FY 1997**	**FY 1998**	**Overall 5-Year Rate**
RI Computed Rate (as Cases per Thousand)	3.4	3.6	3.7	3.8	3.8	3.7
95% Confidence Interval	(3.1 - 3.7)	(3.2 - 3.9)	(3.4 - 4.0)	(3.4 - 4.1)	(3.5 - 4.2)	(3.5 - 3.8)
Total patients with this condition (Numerator)	456	461	467	475	482	2,341
Total patients at risk for this condition (Denominator)	133,572	129,486	126,303	125,772	126,174	641,307
Direction Of Trend	Linear Increase					

Indicator[1]: Adverse effects and iatrogenic complications (complications resulting from medical care)

How do we calculate this measure? Number of adverse effects or iatrogenic complications per 1,000 patients.

Which patients are in the calculation? All discharges.

Why should we look at this rate? This indicator combines a wide range of conditions and procedures that denote possible compromises in care. All patients are at risk for these complications and adverse events; therefore, all cases in the hospital are screened for these conditions.

What do the Rhode Island trends tell us? The five years for which we computed Rhode Island rates (1994-1998) show variable changes meaning the rates show no statistically predictable behavior. The three years for which we have national comparative data show Rhode Island significantly higher in all three years.

How to interpret the graphs

Rhode Island Data: The line connects the five black dots that stand for the rate of occurrence in Rhode Island each year from 1994 through 1998. If the line is slanting upwards, the rate is generally increasing. If the line is slanting downwards, the rate is generally decreasing.

National Data: The points marked by an 'X' are the rates of occurrence in the United States. These are not available for all five years and so are not connected by a line.

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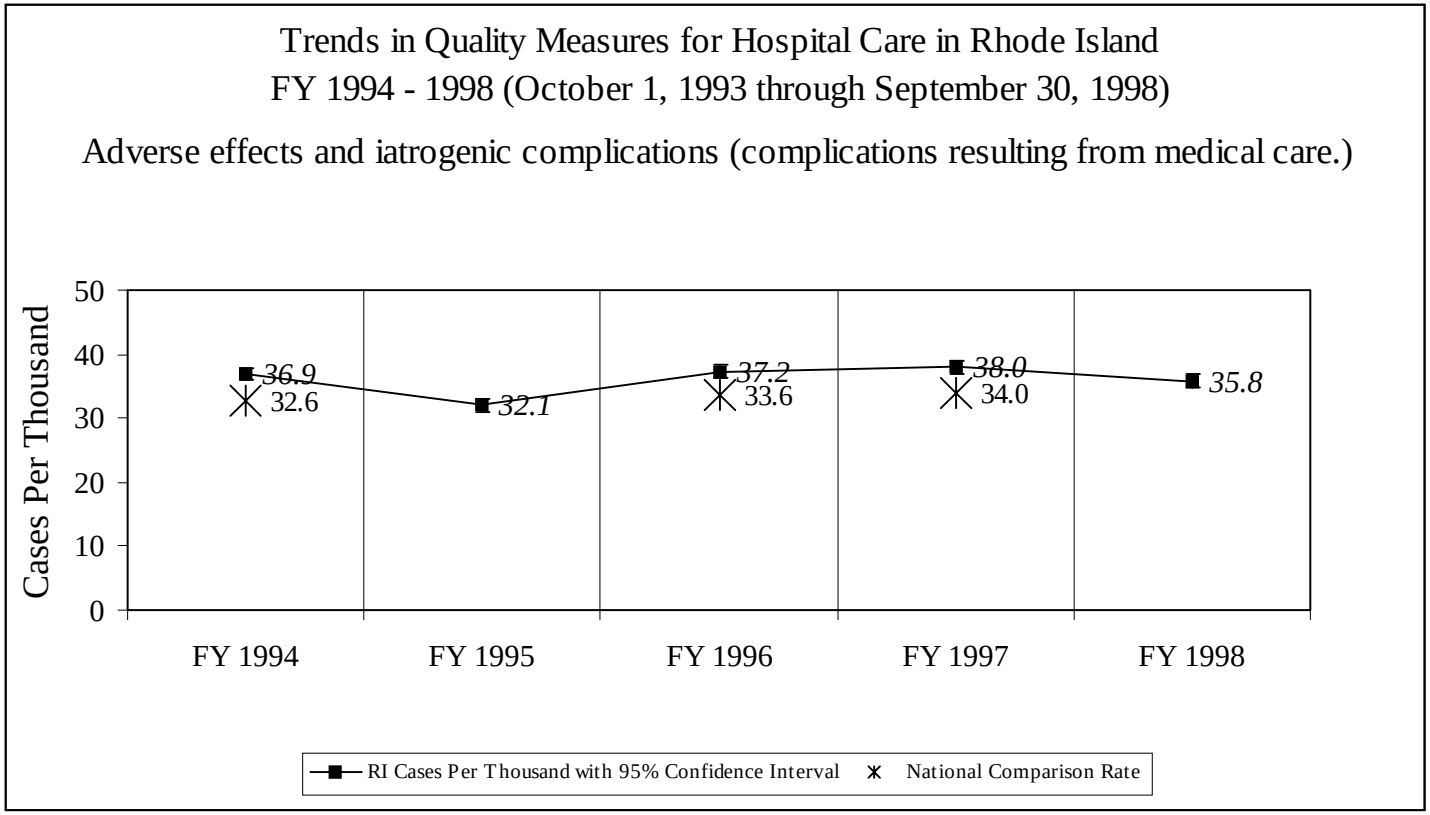

*The National Comparison Rate is based on calendar year data.

Measure Description: **Adverse effects and iatrogenic complications**	**FY 1994**	**FY 1995**	**FY 1996**	**FY 1997**	**FY 1998**	**Overall 5-Year Rate**
RI Computed Rate (as Cases per Thousand)	36.9	32.1	37.2	38.0	35.8	36.0
95% Confidence Interval	(35.9 - 37.9)	(31.1 - 33.0)	(36.2 - 38.3)	(37.0 - 39.1)	(34.7 - 36.8)	(35.5 - 36.4)
Total patients with this condition (Numerator)	4,929	4,150	4,704	4,782	4,511	23,076
Total patients at risk for this condition (Denominator)	133,572	129,486	126,303	125,772	126,174	641,307
Direction Of Trend	No Trend					

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